

HEAVY USE AREA PROTECTION

(Acre)

Code 561

Natural Resources Conservation Service
Conservation Practice Standard

I. Definition

The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, by surfacing with suitable materials, and/or by installing needed structures.

II. Purposes

This practice may be used as a part of a conservation management system to support one or more of the following purposes.

- Reduce soil erosion
- Improve water quantity and quality
- Improve air quality
- Improve aesthetics
- Improve livestock health

III. Conditions Where Practice Applies

This practice applies to urban, agricultural, recreational or other frequently and intensively used areas requiring treatment to address one or more resource concerns.

This practice does not apply to buildings and walls, Recreational Trails and Walkways, Standard 568; Animal Trails and Walkways, Standard 575; Access Roads, Standard 560; feed storage, composting, or pesticide and fertilizer mixing and loading areas. The above standards can be found in NRCS Field Office Technical Guide (FOTG) Section IV.

IV. Federal, State, and Local Laws

Users of this standard should be aware of potentially applicable federal, state and local laws, rules or regulations, permit requirements governing heavy use area protection. This standard does not contain the text of the federal, state or local laws.

V. Criteria

A. General Criteria

The following criteria apply to all purposes.

1. Management Assessment

The assessment shall be performed with the owner/operator to determine planned management and explore design options. A management assessment shall be conducted, documented, and incorporated into the design. The management assessment shall address the following:

- a. type of traffic;
- b. frequency, intensity, season, and duration of use;
- c. cleaning methods and frequency;
- d. access needs; and
- e. expansion needs.

2. Site Assessment

A site assessment shall be conducted, documented, and incorporated into the design. The assessment will determine physical site characteristics that may influence the placement, construction, maintenance, and environmental integrity of the heavy use area protection. The assessment shall include input from the owner/operators. The site assessment shall include, as applicable:

- a. Maps showing locations and elevations of buildings, doorways, roads, lanes, fences, soil test pits, property lines, setbacks, easements, wells, 25-year, 24-hour duration storm floodplain, surface drains, drain tile, above and below ground utilities, cultural resources, wetlands, lakes, and streams.

- b. Pollution potential determined by using models such as BARNY, WINHUSLE, or others.
- c. Soil boring logs and, if available, a soil survey photo. Soil investigation shall include:
 - (1) The number and distribution of soil borings sufficient to characterize the subsurface.
 - (2) The depth sufficient to ensure separation distances in Table 1 of this standard.
 - (3) The elevation of *bedrock*¹ and bedrock type, if encountered, such as sandstone, limestone, dolomite, or granite.
 - (4) Saturation indicators, if encountered, such as seepage from sand and gravel lenses, lens thickness, estimated volume of flow, and elevation.
- d. Locations and elevations of *sinkholes* and other *karst* features within 300 feet of the heavy use area.
- e. Type of soils and location of any borrow areas.

1. Surface Runoff

Heavy use protection areas shall utilize an acceptable runoff control system to meet federal, state, and local requirements.

2. Stability

Heavy use areas located in areas inundated by runoff from a 25-year frequency, 24-hour duration storm shall be protected from structural damage and instability.

3. Groundwater Contamination

Option G in Table 1 shall be used if protection from groundwater contamination is the primary objective.

6. Separation from Saturation or Bedrock

The separation is the closest distance from any point on the top surface of the heavy use

protection area to the feature from which separation is required. Separation distances are listed in Table 1.

- a. The following criteria apply to saturation:

(1) Regional High Water Table

The *regional high water table* shall not be lowered to achieve the required separation.

(2) Confined Lenses and Perched Water

Confined lenses and perched water may be drained. All *drainage systems* shall have gravity flow to a free outlet. The effects of temporary tailwater shall be evaluated and resolved. The effects of outletting to perennial and intermittent waterways shall also be evaluated and resolved.

- b. The following criteria apply to bedrock:

- (1) Excavation of bedrock is permitted to achieve the required separation.
- (2) The surface of any excavated, consolidated rock material shall have a positive grade away from the heavy use protection area, with no depressions on the excavated surface.

7. Design Load

The design load will be based on the type of traffic, (vehicular, animal, or human) anticipated on the heavy use area. The minimum design load for areas that support vehicular traffic will be a wheel load of 5000 pounds.

8. Vegetative Measures

Liming, fertilizing, soil preparation, seeding, mulching, sodding and vegetation management shall be according to the planned use and NRCS FOTG Standard 342, Critical Area Planting, or other appropriate conservation practice standards.

B. Specific Criteria

1. Animal

Surface material criteria and separation distances are listed in Table 1.

a. Surface Criteria

(1) Earthen and Asphalt

Heavy use areas protected with earthen or asphalt surfaces may only be used if cattle have intermittent access to the heavy use area, and are not in total confinement.

(2) Stone

Heavy use areas protected with crushed stone surfaces may only be used if cattle have intermittent access to the heavy use area, and are not in total confinement. A layer of sands, limestone screenings, or other materials providing cushioning for cattle hoof contact is required and shall be a minimum of 2 inches thick following compaction.

(3) Concrete

Heavy use areas protected with concrete may have cattle in total confinement. Concrete at feed bunks and waterers is strongly encouraged.

- b. Animal yards or lots shall be located a minimum of 50 feet from any well or sinkhole.
- c. The minimum area for various animal types and lot surfaces shall be the smallest areas shown in Tables 1-1 through 1-4, beginning on page WI-10-50 of Chapter 10 in the NRCS National Engineering Handbook (NEH) Part 651, Agricultural Waste Management Field Handbook (AWMFH) or in livestock planning handbooks published by Midwest Plan Service.
- d. The minimum slope for planned paved lots shall be 1%, except for small-

localized areas. The maximum slope shall be 6%, except for small-localized areas.

- e. The minimum slope for planned unpaved lots shall be 1%. The maximum slope for planned unpaved lots shall be 10%, except for small-localized areas and cattle mounds. The maximum slope for cattle mounds is 20%.
- f. Existing lots should be utilized whenever possible. Lot slopes exceeding those recommended for planned construction may be permitted providing the landowner has successfully operated the system and agrees to continue operation of the existing lot.
- g. Concrete steps for cattle shall be built with a maximum rise of 8 inches and a minimum run of 24 inches. The width of the steps shall be kept narrow (approximately 3 feet) to keep the cattle moving in single file.
- h. All concrete surfaces shall be grooved or roughened for animal safety.
- i. Provisions shall be made to collect, store, utilize and/or treat manure accumulations and contaminated runoff in accordance with NRCS FOTG Standard 313, Waste Storage Facility or Standard 635, Wastewater Treatment Strip.

2. Vehicle

Surface material criteria and separation distances are listed in Table 1.

- a. Turning radius shall be as required by machines and equipment, or as listed in handbooks published by Midwest Plan Service.
- b. Maximum slope shall be as practicable for the intended use.

3. Roof

- a. Roofs shall be designed to withstand expected snow and wind loads in accordance with American Society of Civil Engineers (ASCE) Minimum Design Loads for Buildings and Other Structures, SEI/ASCE 7-02.
- b. Vertical supports for roofs shall support the roof for wind and snow loads described above. Design for vertical supports shall include anchoring to resist uplift forces. Fasteners shall be capable of supporting all horizontal and vertical loadings.

VI. Considerations

Additional recommendations relating to design which may enhance the use of, or avoid problems with, this practice, but are not required to ensure its basic conservation function are as follows:

- A. Livestock operations cause odor, dust, and noise. Consider separation distances to residents and landscaping around the heavy use area.
- B. Consider the health and welfare of the animals, safety of humans and animals, and installation and long-term maintenance cost when choosing the layout, topography, and materials of the proposed heavy use area.
- C. Roof construction for barnyards and feedlots may be used to control polluted runoff. Roof construction may be used where other runoff systems will not adequately reduce the pollutant potential.
- D. A combination of practices, in addition to heavy use area protection, should be considered to reduce the pollution potential. These practices may include, but are not limited to: Roof Runoff Structure, Standard 558; Grassed Waterway, Standard 412; Lined Waterway or Outlet, Standard 468; Diversion, Standard, 362; Underground Outlet, Standard 620; Waste Storage Facility, Standard 313; Manure Transfer, Standard 634; Subsurface Drain, Standard 606; Critical Area Planting, Standard 342; Sediment Basin, Standard 350; and Wastewater Treatment Strip, Standard 635. The above standards can be found in NRCS FOTG Section IV.

E. Low clearance and short wheel base vehicles should utilize yard entrances slopes of 20 horizontal to 1 vertical (20:1) or flatter.

F. Consider adjoining land uses and the proximity to residences, utilities, cultural resource areas, wetlands or other environmentally sensitive areas, and areas of special scenic value.

VII. Plans and Specifications

Plans and specifications for heavy use area protection shall be in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. A construction plan is required.

VIII. Operation and Maintenance

An operation and maintenance plan shall be developed that is consistent with the purpose of this practice, intended life of the components, safety requirements, surface layering, vehicle loading, management assessment, and criteria for design.

The plan shall specify that the treated areas and associated practices are inspected annually and after significant storm events to identify repair and maintenance needs. The plan shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

IX. References

American Concrete Institute, Design of Slabs on Grade, ACI 360. R-92.

American Society of Civil Engineers (ASCE), Minimum Design Loads for Buildings and Other Structures, SEI/ASCE 7-02.

BARNY - Wisconsin's barnyard runoff model. Publication # WR-285-91, Wisconsin Department of Natural Resources (WDNR).

Midwest Plan Service, Iowa State University, Ames, Iowa.

United States Department of Agriculture - Natural Resources Conservation Service, National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook.

United States Department of Agriculture - Natural Resources Conservation Service, National Engineering Handbook, Part 650, Engineering Field Handbook.

United States Department of Agriculture - Natural Resources Conservation Service, Wisconsin Field Office Technical Guide, Section IV (Conservation Practice Standards and Specifications).

WINHUSLE - Wisconsin's nonpoint source sediment delivery model. Publication # WR-294-91, WDNR.

X. Definitions

Bedrock (V. A. 2. c. (3)) - Consolidated rock material and weathered in-place rock material with > 50%, by volume, larger than 2 mm in size.

Confined Lenses and Perched Water (V. A. 6. a. (2)) - Water bearing deposits of stratified lacustrine material or material laid down by glaciers between deposits of less permeable till. Perched water is saturation found above and separated from the regional high water table.

Drainage Systems (V. A. 6. a. (2)) - Water conveyance measures of specified capacity, location, and material that insure the removal of water to a free outlet.

Karst (V. A. 2. d.) - Refers to areas of land underlain by carbonate bedrock (limestone or dolomite). Typical land features in karst areas include sinkholes, disappearing streams, closed depressions, blind valleys, caves, and springs. See the AWMFH for additional discussion of karst features.

Regional High Water Table (V. A. 6. a. (1)) - The seasonal high free water surface of a large body of groundwater covering a region. All soil below the regional water table is saturated. Soil mottling (redoximorphic features) is an indication of soil saturation, but is not necessarily an indicator of the regional high water table.

Sinkholes (V. A. 2. d.) - Closed, usually circular depressions which form in karst areas. Sinkholes are formed by the downward migration of unconsolidated deposits into solutionally enlarged openings in the top of bedrock.

Table 1
Surface Material Criteria and Separation Distances

Option	Foundation Condition	Cross Section Option	Separation to Bedrock or Saturation (ft)
A	firm ¹	Raised Earth	3
B	firm	Minimum 6" crushed stone ²	3
C	firm	Minimum 6" crushed stone over NRCS Wisconsin Construction Specification (WCS)-13, Geotextile, Class IV	3
D	firm	Minimum 4" crushed stone over 6" base course of graded rock ³	3
E	firm	5" non-reinforced concrete with maximum control joint spacing of 16' in both length and width, over 6" sand/gravel	1.5
F ⁴	firm	5" reinforced concrete with designed control joint spacing, over 6" sand/gravel	1.5
G ⁵	firm	5" reinforced concrete with waterstop, over 6" sand/gravel	1.5
H	firm	Minimum 3" asphalt over 6" sand/gravel	3
I	soft ¹	Minimum 4" crushed stone over 8" base course of graded rock over 6" of sand and fine gravel	3
J	soft	Minimum 4" crushed stone over 8" base course of graded rock over NRCS WCS-13, Geotextile, Class IV	3
K	soft	Minimum 4" crushed stone over 18" base course of graded rock	3
L	soft	Minimum 4" crushed stone over 18" base course of graded rock over 6" sand and gravel	3

¹ Guidance can be found in EFH Chapter 4 and Figure 4-14 for information regarding bearing capacity and foundation properties.

² Crushed Stone: 100% passing ¾" sieve and 10% maximum passing the #200 sieve.

³ Graded Rock: 100% passing the base course thickness dimension and a maximum of 10% passing the ¾" sieve. All sizes between the limits shown on the drawings are to be represented.

⁴ Reinforcing and control joint spacing according to Subgrade Drag Theory Design as found in ACI 360, Design of Slabs on Grade, or Engineering Field Handbook, Chapter 17.

- ⁵ • Option G is the only option that can be used where the potential for groundwater contamination is the resource concern.
- Option G requires deformed steel reinforcing bars and control joint spacing according to Subgrade Drag Theory design.
- Option G requires the installation of imbedded waterstops at all control, construction, and isolation joints.
- Waterstop = non metallic waterstop in accordance with NRCS Wisconsin Construction Specification 4, Concrete.
- Maximum wheel load of 5000 pounds at spacing of 8 feet or to be designed using ACI 360, Design of Slabs on Grade.